4MinX

Portable Mixer/Recorder

User manual

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D – Build on firmware V1.5
E – Build on firmware V1.6.1

Introduction

4MINX is a portable mixer specially designed for outside recording.

4Minx is new kind of product on this market. It can be use as a traditional mixer, but can be use as a multi tracks recorder. In same time, it can manage digital audio treatment in real time.

This equipment is suitable for sound production, with its remarkable audio features and its full compatibility with « M/S » and « surround » systems. 4Minx have 4 Mic/Line inputs, with all power phantom and limitor, 2 digital inputs AES3. Digital inputs support the normalization AES42 for digital microphones (10v phantom power).

4Minx has many outputs, 6 analog channels and 6 digital channels AES3.

The routing capability for each input and each output give complete liberty to the user.

The multi tracks recorder can grow up to 8 tracks on SD/SDHC card and can make a backup on external USB disk. You should use SD/SDHC card Class 10 or similar to avoid problems.

A project management included in the unit gives the opportunity to make many sounds recording without problem.

4MinX has a keyboard and a 3" TFT high quality display, offer a simple and nice user interface. On 4Minx the user can set its own mixer interface in regards inputs and outputs need in his configuration.

To start a work quickly, you can read the quick start delivery with the unit. It will provide you all details step by step to start a record.

1. Technical Characteristic

- Light weight and small dimensions (1.9 kg, 260 x 75 x 195 mm)
- 4 Mic/Line transformerless inputs, very low noise (-128dBu)
- Adjustable input gain, 10 dB steps, 0 to +50 dB
- High-pass filters on each channel
- Maximum overall gain: 90 dB, useful for dynamic and ribbon microphones
- Maximum input level: +19 dBu without pad
- Input headroom: 40 dB, independent of input stage gain
- LED for overload warning on each input channel
- Fast limiter on each input, 40 dB operating range, with LED indicator
- Stereo or M/S coupling on inputs 1&2 et 3&4
- Stereo ↔ M/S encoder/decoder on inputs 1 & 2, 3 & 4
- 4 main line outputs, maximum level adjustable from -9dBu to +22dBu
- 2 return or auxiliary line inputs, maximum acceptable level adjustable from -9dBu to +22dBu (for 0dBFS)
- separate Stereo ↔ M/S encoders/decoders, for monitoring
- 2 unbalanced outputs (level 6 dB below the balanced outputs)
- 3" QVGA TFT screen with adjustable brightness, displaying large scale bargraphs (50 dB dynamic range)
- High performance headphone amplifier, with selectable source and listening mode
- Long operating range on Li-Ion DV battery and charger inside
- 3 AES3 digital outputs, stereo, 24 bits, up to 96 kHz
- 2 AES3 digital inputs with phantom +10V for AES42 microphones with sample rate convertor.

2. Functions

The functions of the analog and digital mixer are shown on the functional diagram that can be found in annex **Erreur ! Source du renvoi introuvable.**, "**Erreur ! Source du renvoi introuvable.**". On next paragraph, we will describe in detail all inputs and outputs of the 4MinX

2.1. Audio Inputs

2.1.1. Input "Mic/Line"

Each of these four inputs is available on a 3-pin female XLR socket, and is electronically balanced. Each input support 48V phantom power or T12 power. If no powering is active, unbalancing an input has no negative impact on the performance.

. Each input has its own volume control on the front panel, generally named « fader ».

Specificities:

- Inputs 3 and 4 can also be fed from the "EXT I/O" socket, in which case ***no microphone powering*** is available
- Input 1 and 2 can stand very strong audio levels thanks to a 20 dB attenuator. When it is enable, the input level can grow up to +39dBu.

Functions of the "MIC/Line" inputs

The following functions are available on each input, via a selection in the menu:

- Input stage gain setting, 0dB to +50dB, 10dB steps;
- Phantom power for a microphone, 48V, or “Tonader 12V” ;
- Analog high-pass filtering, 50 Hz cut-off frequency, 18dB/octave;
- Digital high-pas filtering, 50 Hz to 200Hz 12dB/octave and 300 Hz, 6dB/octave, suitable for compensating proximity effects in directional microphones
- Polarity inversion (phase reversal)
- Fast limiting, with “soft knee”;
- Routing to Left or Right bus, or Center (i.e. L and R), with pan-pot, or not routed at all
- The “risk of overload” LED begins to light at 12 dB below overhead.
- Attenuator (20dB) can be enable on the mic/line input 1 & 2

Note:

- The 50Hz analog filter can be enabling in the same time as the digital filtering. In this case rate will be 32dB/Oct below 50Hz.
- A limiter can be inserted into each channel (post-fader). Its activation is shown by a green LED that turns red when the signal begins to limit.

Stereo and M/S

Via menu selection, channels 1 and 2, 3 and 4 can be used as independent channels or coupled for stereo or M/S operation. When used as a couple of stereo or M/S channels, the channel impair becomes the master, controlling the level of both channels. The channel pair provides +/-5dB adjustment of the balance in L/R mode (normal stereo), or the stereo width in M/S mode.

In normal stereo mode, the transducers usually have matching sensitivity:

- Any change of the input gain on one channel induces the same on the other channel;
- The even channel control controls the balance between L and R channels by +/- 6dB

- Input odd is routed to the Left bus, input pair is routed to the Right bus
- The even input is routed on the mix down Left and the odd on the mix down right. But, Over writing these routing remains possible!

In "M/S" mode the transducers often have different sensitivity:

- The input gain adjustment is kept separate for channels odd and even,
- The odd channel control adjust the couple level
- The event channel control adjusts the stereo image width. In the center detent position, a coherent couple should provide a normalized 110° angle
- Whenever inverting the phase of channel even, after decoding from M/S to L/R the stereo image is reserved L↔R
- Manual routing is inhibited and the signals are routed and decoded as follows:
  Input impair is the "M" signal, input pair is the "S" signal;
  Input impair + Input pair (M+S) is routed to the Left bus;
  Input impair - Input pair (M-S) is routed to the Right bus.

Limiters

A limiter can be inserted into each channel, after the channel fader. This is a fast limiter with a dynamic range wide enough to stand the 40 dB overhead of the input stage. The activation of the limiter is shown by an LED.

As long as the signal level stays below the limiter threshold, little effect is seen on the signal. When the limiter is triggered, its output stays 6dBFS below the A/D converter clipping level for up to 40dB input overdrive.

It can thus be seen as a "safety" limiter, that may be left active all the time!

The threshold can be adjusted through the menu from –12dBFS to –3dBFS

Note: In case of use specific coupling the limiters are coupling together, which is the required mode for applying simultaneous and identical gain reduction to both channels in « stereo » and M/S modes, in order to preserve the coherence of the stereo image.

2.1.2. Line inputs/return

Two inputs are available on a 5-pin female XLR socket, and are electronically balanced. It is possible to unbalance an input without negative impact on the performance. Each channel has its own maximum level adjustment in the menu from -9dBu to +22dBu (for 0dBFS). Theses inputs can be use as a return from video camera but can be use as more analog entries for the mix down or the recorder. It is possible to have a fader control on each input through P1 to P4. In this case, we provide you 15dB more gain.

2.1.3. Embase “EXT I/O”, Récepteurs HF

The “EXT I/O” socket is available for the connection of an optional extension box. This device can be used to interface 4MINX with radio transmitters and/or receivers.

When the extension device is plugged into the “EXT I/O” socket, the mixer can use, for channels 3 and/or 4, inputs from the EXT I/O socket instead of XLR inputs 3 and 4. In this case NO microphone power is apply on these inputs.

The extension device feeds these inputs with two balanced signals. *For safety, no microphone powering is inserted into these inputs on the EXT I/O socket* but all others settings are the same.

On this interface, you have 2 asymmetrical outputs. Theses outputs are described on the need paragraph.

Note: A 9V/ 600mA power supply is available on the connector.

2.1.4. AES Inputs

4MINX can accept AES3 digital audio input on its « Dig. In » (XLR 3 pins). Signals can be routed or mixed in the bus as others inputs or send to any outputs.

The input 1&2 can be used to synchronize the 4minx on another machine. This feature can be set in the synchronization menu, it is necessary to specified in the same menu the frequency of the AES signal. Both digital inputs are using a sample rate convertor when you are in master mode.

Note: Don't forget to set the right sample frequency on the synchronization menu when you want to use the AES input as synchronization

2.2. Analog outputs

2.2.1. Main outputs “Line Out”

4Minx have 2 stereo line outputs on XLR 5 pins. By menu, you can set source for each channels between all inputs, bus, monitoring.

The signals are electronically balanced; they can be unbalanced with no impact on performance, as long as the level stays below +19dBu.

The maximum output level (which corresponds to the maximum digital level, 0dBFS) is adjustable via the menu, from -9dBu to +22dBu.

Also via the menu, a 40dB attenuator can be inserted on each output channel, so providing a “microphone level” signal.

2.2.2. Unbalanced “Line Out”

The same signals of the first “stereo” line output as found on the XLR5M socket are also fed to a 3.5mm stereo mini-jack socket. These signals are unbalanced, and their level is **6dB below** those on the balanced XLR5M **.**Their typical use is for linking the mixer to a semi-professional recorder (Mini-Disc, cassette, DAT…) or connecting a second headphone

2.2.3. Analog outputs for radio transmitters

The L and R mix buses or any inputs can output on the « EXT I/O » socket (on the left side of the unit), with a separate adjustment of the maximum level for each channel from -20dBu to +10dBu, which allows a suitable adaptation to most radio transmitters. These outputs are asymmetrical.

2.2.4. Digital outputs

4MINX delivers 24-bit stereo digital outputs; it is possible (via the menu) to select either a “Pro” mode or “Consumer” mode, depending on the type of equipment the signals are fed to.

A balanced and transformer isolated AES output (110Ohm impedance) is available on the “Dig. Out” socket. It is possible to connect this AES output to a SPDIF input through an adaptor cable (optional: see Annex).

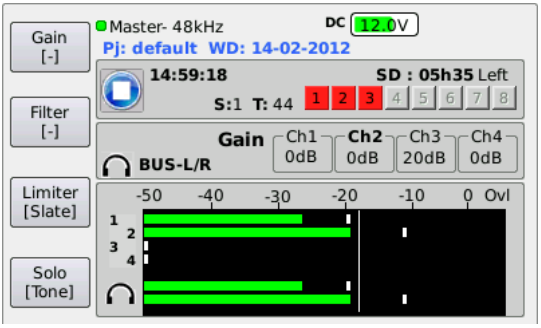
2.3. Monitor

2.3.1. Display screen

The display screen of 4MINX is a 3” color QVGA TFT display. This technology features a very wide viewing angle and fast response time. The display brightness is adjustable, it has latest technology for a perfect outside used.

On the main screen:

- The monitoring audio level of left and right signals are showing at the bottom of the display
- Just over them the level of the four mixer channels is shown.



- Levels are displayed on large scale bargraphs covering -50dBFS to 0dBFS.
- By menu you can set 4 metering level threshold (Minimum, nominal, yellow, red)
- They are measured with fast PPM ballistics.
- In addition, peaks are held on for about 4 second (“peak-hold” function)
- An “OVL” icon shows up whenever the level reaches -3dBFS or more.
- Input number are display in red when you enable a coupling between us (when 2 stereo or M/S coupling are selected, the second is show in blue).
- If you select pre fader by menu for the input, a ‘P’ is display

2.3.2. Configuration

The « Monitor » function allows the selection of signals inside 4MINX for displaying their levels on the screen and monitoring them on headphones

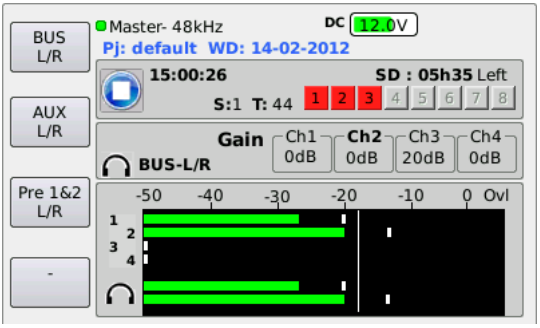
Just by pressing monitor key and moving the rotary, you can select the following signal sources for monitoring:

- Input 1 to 4, in post or in pre ***fader***
- Channel couple : AES 1&2, AES 3&4
- Return/Line In couple of signals
- Bus
- …

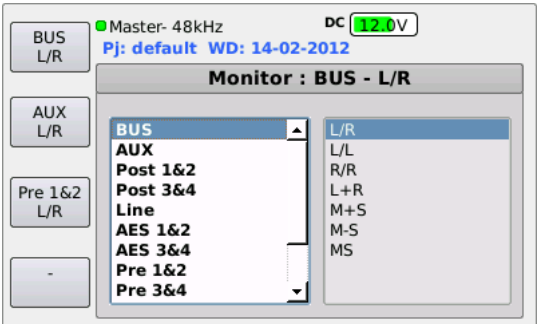
Note: The selection can be affected on one of function key (F1 to F4) by a press on it.

A second bank is available by pressing the Shift

You have a total of 8 monitoring presets



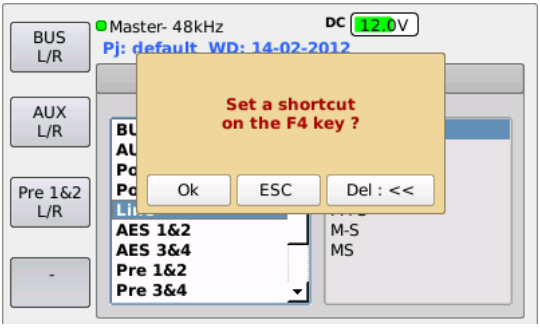
Note: When presets are available, you should press twice the monitoring key to access to this menu.



Note: press the monitoring key to swap between sources and mode.

To set a shortcut key, you have just to press it under this display. The current selected source and mode will be saving on this shortcut key.

Example : Set preset F1



2.3.3. Headphone monitoring

The headphone can be plugged into a stereo 6,35mm jack socket. By pressing twice the monitoring key and vertically moving the cursor with the rotary, the monitor mode can be selected among the following:

- L/R : Normal stereo listening ;
- L/L: left signal on both ears ;
- R/R: right signal on both ears ;
- L+R : mono sum (L+R) on both ears;
  (useful for mono compatibility and phase coherence checking)
- M+S : M+S sum (normally left signal) on both ears ;
- M-S : M-S sum (normally right signal) on both ears ;
- M/S: listening of encoded signals (sum and difference)

The L/R↔M/S matrixing is used for example to listen a conventional stereo signal (L/R) when monitoring M/S microphones, or when monitoring outputs that have been M/S encoded.

- Alternatively, when the mixer is operated in normal stereo mode, encoding the signals for monitoring can be used to check the stereo correlation, by comparing the relative amplitude of the M and S signals

2.4. Internal alignment signal generator

An integrated double oscillator can deliver a sinusoidal 1 kHz on the left and a 400Hz on the right to outputs. This can be used to align analog equipment connected to these outputs. This signal is activated on all outputs (analog and digital).

The peak level of the generator is **-18dBFS** (EBU digital reference level) by default but can be adjusted by menu from (-12 to -20dBFS).

A function key can be set to have a direct access to the

2.5. Intercom / Slate microphone

A microphone is integrated in 4MINX's front panel; its amplified signal can be inserted into the analog/digital outputs (replacing the normal audio signals). See audio routing, Slate.

A function key can be set to have a direct access to the feature.

2.6. Alimentation

4MINX operates from Li-Ion DV battery type NPF-9x0. The integrated charger can recharge it from an external DC supply in less than 7 hours (depending of the battery capability).

The DC/Bat LED becomes red to show the proper operation of the internal charger. This LED becomes green at the end of the charge. If you don't want to charge the battery, you should use a dedicated power cable without connection on the Charger dc input pin (See connectors paragraphs), which may be desirable e.g. if the external source is itself derived from a battery pack.

4MINX can operate from an external source of **8 V to 18 V DC** voltage. 4MINX draws *constant power* from the external source when the voltage changes. 10V minimum is need for charging.

The same LED becomes green to indicate the presence of the external power source. 4MINX switches automatically between its internal battery and

the external source, without any noise (priority is given to the external source when it is available!)

The low battery level can be adjusted by menu from 6,4v to 7,4v. When this threshold is reached, a warning message is display on the screen and the battery icon is set in red.

Whenever the battery voltage goes down to 6.4 V, 4MINX is automatically shut off. This prevents damaging the battery by discharging it too deeply.

4MINX's power consumption and hence its battery range depend much on the operating conditions, such as the number and powering mode of the microphones, headphone impedance and listening level, etc.

However, as an example, starting with a full charged battery, 4MINX will operate for at least 7 hours (Sony NP-F970) with dynamic microphones (including ribbon microphones) and a 600 Ω headphone. In such condition, 4MINX draws less than 500mA from a 14.4V external source.

4MINX draws a near-constant *power* (not a constant current) from the external source when the voltage varies

3. Operating mode – Detailed description

3.1. Switching on and off

Hold down the “Esc” button for more than 2 seconds; the screen will light up and display the AAS logo after few seconds and after the application start.

To switch off the unit, you should go in the menu tools, power down; Like that, you will preserve the integrity of the systems and limits the risks to have defective audio files.

Note: It is possible to switch off the unit by holding down the “Esc” button for more than 10 seconds. This should be use only for emergy used.

3.2. General principles

To enter the menus, push (just shortly this time!) the “Esc” button. The main menu is then displayed. Pressing again the “Esc” button brings you back to the normal meter display mode

You can navigate inside the menus and across lists using the rotary.

To change an item, first move towards it using the rotary until the item is highlighted; then select the item by pressing the “OK” button or push down the rotary. Change the selected item or value using the rotary, and press again the “OK” button to confirm the change.

Press the “Shift” button to leave a menu from one level

Press the “Esc” button to leave a menu; repeat the press to return to the normal meter screen

In some case, F1 to F4 keys can be used as function key

3.3. Menu structure

The menu is divided in 4 sections

- Audio configuration with
  - « Audio input » : Analog and digital inputs settings
  - « Audio Output » : Analog outputs settings
  - « Coupling » : analog input coupling between input 1 to 4
  - « Routing » : Output routing & bus mixing
  - « P1-P4 » : P1 to P4 potentiometers function
  - « Master » : Master gain level
  - « Mixdown limiter» : Limiter/Compressor configuration

- Recordings
  - « Project management » : To create, delete and modifie a project
  - « File management » : Configuration of recorded files
  - « Filename template » : template of recorded files
  - « Meta Data » : Management and entry of medata for BWF files
  - « File format » : Configuration of number of bites in the files
  - « Pre-record » : pre record time configuration
  - « Backup false take » : Enable false take backup

- « Backup to USB »: Enable the backup of the current working day on an USB disk.

- Settings
  - « Synchronization » :to set synchronization source and the sample rate frequency
  - « Tone generator » : Adjust the tone generator level
  - « Time code » : Set all time code configuration: mode and video rate
  - «Snapshots« : Manage snapshots (user memories)
  - « Display settings » : Configuration of bargraphs and brightness adjustment
  - « Function keys » : Assign feature on assignable F1 to F4 key
  - «Recording BIP» : Enable/disable BIP on record start and stop
  - « Date » : To change the system date
  - « Time » : To change the system hour
  - « Keyboard auto lock » : Automatic lock of the - and + keys after 10s
  - « USB keyboard » : keyboard language selection

- Tools
  - « Power down » : to switch off the unit
  - « Sleep» : to put the 4Minx in Sleeping mode
  - « Eject media »: Un mount SD card before removing it from its holster. NEEDED TO AVOID PROBLEMS
  - « Format media » : to format the SD card
  - « Reset settings » : Load factory configuration
  - « Import » : Load settings and projects form the SD card
  - « Export » : Export settings and projects to the SD card
  - « Warning Threshold» : Set threshold warning level of the battery, the external DC level and the disk space
  - « Update firmware » : update the firmware from the SD card

- About
  - Show system information : version, configuration, IP address
- Shortcut list : Show shortcut key features

3.4. Menu : « Audio »

3.4.1. Menu : « Audio Inputs »

- For each microphone 1 to 4
  - The microphone gain can be set from 0 to +50dB by 10dB step
  - An analog filter at 50Hz 18dB/Octave can be enable
  - A limiter can be enable
  - A 48Volts phantom power can be enable or a Tonader 12V.
  - The phases can be inverted
  - Specific settings for microphone input 1 and 2 : An 20dB attenuator (PAD) can be enable.
  - Specific settings for microphone input 3 and 4 : The input connectors can be switch from standard XLR 3 pin to the MiniCon 12 pins

- For the line inputs (1 and 2)
  - The maximum level can be set between -9dBu and +22dBu

- For each AES inputs (1&2 and 3&4)
  - 10V phantom poser can be enable (AES42 normalization)
  - A fixed gain can be set between 0dB to 36dB by 6dB steps

- « Limiter Threshold » : Adjust the microphone limiter threshold between -3dBFs to -12dBFs, -6dB is the minimum value to accept the full dynamic input range.

3.4.2. Menu : « Audio Output »

- For each line from 1 to 4
    - The maximum output level can be set between -9dBu to +22dBu
    - A 40dB attenuator can be added.

- For each Extended outputs on I/O connector (MiniCon)
    - The maximum output level can be set between -20dBu to +10dBu
    - « AES out mode » : AES format : « Pro » or « Consumer »

3.4.3. Menu : « coupling »

In this menu you can select microphone coupling between:

For 2 inputs: Stereo or M/S coupling on inputs 1&2 or 3&4

For 3 inputs: Double M/S, inputs 1&2&3

For 4 inputs: Link between 1-2-3-4 or SoundField (option for the SPS200 microphone)

3.4.4. Menu : « Routing »

Under this menu, we can set inputs sources mixing together in the stereo bus (Mix down) and in the auxiliary 2 channel bus « AUX »

Note: The master has no effect on the auxiliary bus. An automatic attenuation is made depending of the number of selected sources.

For each analog and digital output you select one of any inputs, the mixing bus, monitor or play back sources

Last point, you can specify on witch outputs the slate will be send.

3.4.5. Menu : « P1-P4 function »

Under this menu, you can assign many features on the P1 to P4 potentiometers

1. You can have a panpot feature on the microphone input 1 to 4. When you select this feature, the selected input is automatically routed in the mix down with panpot. When you disable it, the selected input is routed in L&R in the mix down.
2. You can configure a gain adjustment on the input line 1 & 2, both can be coupled on a single potentiometer or separated on 2 potentiometers. The line input accepts a maximum level of + 24dBu and gain adjustment covers a range of + 15dB to-90dB
3. You can configure a gain adjustment on the AES input 1&2 or 3&4. Each couple can be coupled on a single potentiometer or separated on 2 potentiometers. The gain adjustment covers a range of + 15dB to-90dB.

3.4.6. Menu « Mixdown limiter »

Under this menu, you can enable or disable a limiter and/or a compressor on the mixdown.

The user can adjust many parameters. At first you should set the limiter threshold (Adjustable from -2dBFS to -20dbFS), after that the compressor threshold (adjustable from -40dBFS to the limiter threshold) and last parameter, the compression of the compressor (Disable to 1:6).

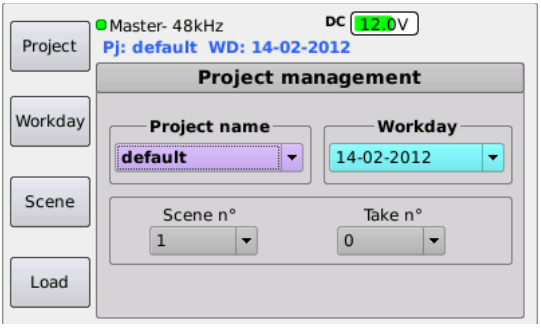
To simplify the configuration, we have defined 3 profiles for the reactivity of the limiter / compressor: Slow, normal and fast

3.5. Menu : « Recording »

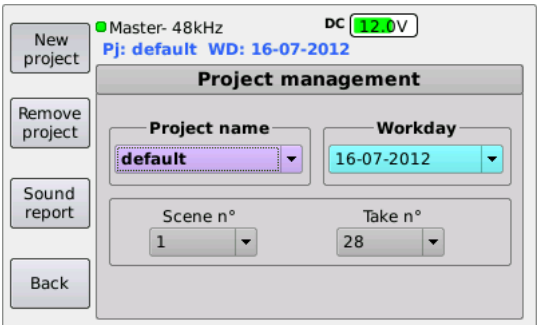
This menu allows you to manage records on a shoot. Each shooting can be associated with a project, in the project you can create work days. These work days can follow or not calendar days.
At each new record, the take counter is automatically increased.
If you want to split into "subgroup" records, can select different scenes. In contrast to the "take", there is no auto-incrementing

3.5.1. Menu: « Project Management »

This menu allows you to manage your projects. We have 3 parts, the first to manage projects, the second to manage working days and the last to manage scenes. Access to the different parties is making through the function keys. Via the main interface, below, you can change project and working day. The validation of a project is necessary to enable it. The validation is done through the function F4 key



1. Project management



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- This module allows to create a new project, the work day will be the day of the machine (date system)

- You can destroy a project. But to destroy the current project, it is necessary to select another project before. Only information related to the project is destroyed but not audio files are destroyed.
- You can generate a report of the complete project in HTML and CSV format on SD card trough the Sound report menu

4MINX Report

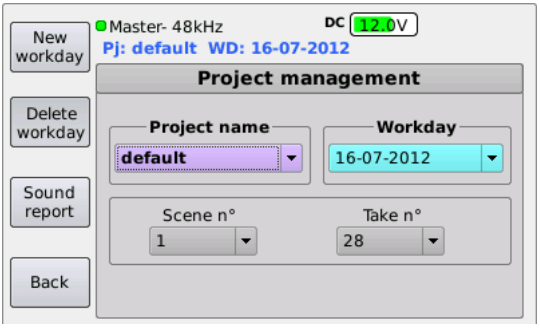
Machine: my 4MinX | **User: My name** | **Version AAS: 1.5 21/03/2012**

Project : my_project

WORKDAY'S : 21-03-2012

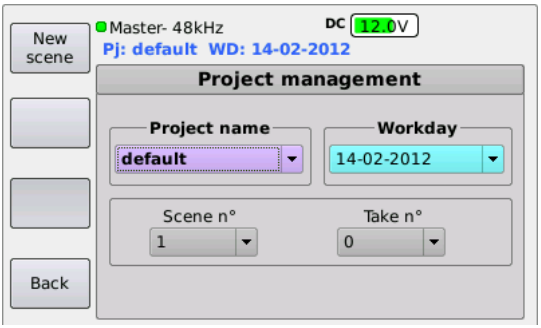
Filename	Scene	Scene	Take	StartTC	Duration	Circled	F1	F2	F3	F4	F5	F6	F7	F8	Date
-1_1_xx	first_scene	1	1	06:12:03	00:00:09	FALSE	[1]BUS L,[2]BUS R	[1]boom	[1]Post 3	[1]MIXY L,[2]MIXY R,[3]mic AES42 n1,[4]mic AES42 n2					2012/03/21 13:57:56
Note:	My note														
-1_2_xx	first_scene	1	2	06:12:47	00:00:06	TRUE	[1]BUS L,[2]BUS R	[1]boom	[1]Post 3	[1]MIXY L,[2]MIXY R,[3]mic AES42 n1,[4]mic AES42 n2					2012/03/21 13:58:22
Note:	My note														
-1_3_xx	first_scene	1	3	06:13:06	00:00:14	FALSE	[1]BUS L,[2]BUS R	[1]boom	[1]Post 3	[1]MIXY L,[2]MIXY R,[3]mic AES42 n1,[4]mic AES42 n2					2012/03/21 13:58:50
Note:	My note														

2. Work day management



- This module allows creating a new work day with the date system
- You can destroy a workday. ATTENTION: all information and AUDIO files of this day will be destroyed. It is the only way to destroy audio files.
- Can generate a report of the day's work in HTML and CSV format on SD card via the Sound report menu.

3. Scene management



You can create a new scene in the project when you want. The scene index is not related to working days. It increments regardless

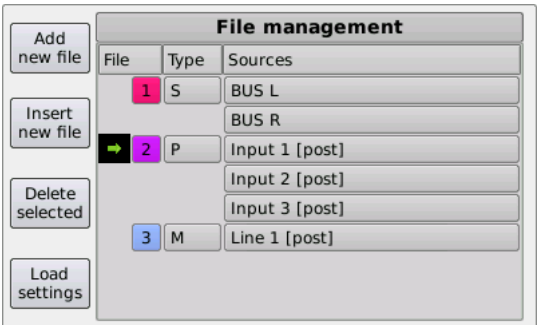
For all modules, the navigation between the different drop-down lists is done through the encoder as in menus. The activation of the Ok allows entering and getting out of the various fields. The Esc key cancels any changes.

3.5.2. Menu : « File Management

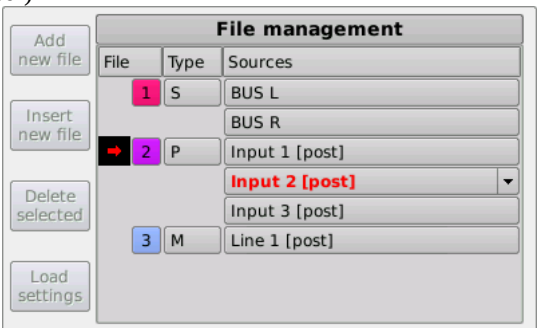
In this menu, you can configure your records. This configuration is linked to the active project.
We work by file. Each file can be either Mono, stereo or well polyphonic (several mono tracks in the same file). The files are WAV files with the extension BWF and iXML fields. This type of file remaining fully compatible with a standard WAV file.
For each file, you can select the sources. The number of selectable sources depends on the number of tracks "authorized" on your machine (see "About" menu)
To create or destroy files, you have at your disposal the function keys. Once your configuration is performed, it must validate it with the F4 key

.

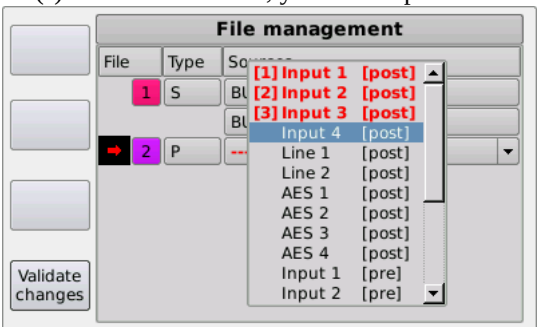
This is the new file management interface. Now, you can insert, delete or add a file where you want. Each source in each file is showed like that.



If you select a file by Ok, you can change the type. You can change all or only one source. You should use the rotary do go on the field whose be modify (displayed in red)

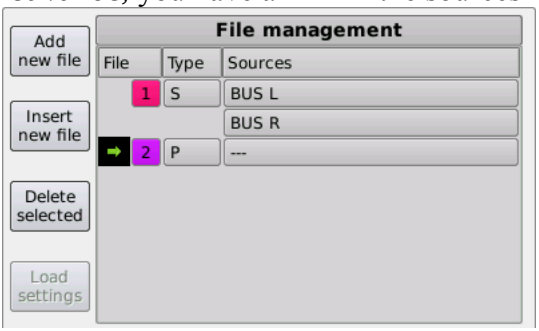


To validate source(s) of the selected file, you should press **F4 or SHIFT.**



Or press Esc to cancel modification.

If the file is not valide, you have a '---' in the sources field.



3.5.3. Menu : « Filename template »

Through this menu, you can change the root of the file name. You have at your disposal 3 fields. For each field, you can select information of the project for example the name of the project, the name of scene…
The file will have the following name:
[Field 1]_[Field 2]_[Field 3]-[scene index]_[Take index]_[File number]-[Split file index].wav

3.5.4. Menu : «Meta data »

In this menu you can enter a name for the current scene, notes on the current scene, put a machine name in the sound report and also enter a user name.

To entry data you have at your disposal a virtual keyboard if you haven't an USB keyboard connected.
Virtual keyboard:

- The letter selection is made via the encoder
- The validation of the letter is made via the OK button.
- You can change the position of the cursor in the text with the keys and .
- The Stop key inserts a space in the text.

If you use a compact keyboard, you can enter accented characters in notes field

Note: When the "Automatic note" option is enabled, at the end of each recording, the note entry appears. This allows modifying quickly the note between each takes. You can at the same time mark your scene as good via the F1 key ("circled").

You can specify the nature of the record via the menu "Recording type". This information can be used in the name of the file

A canvas is available in this menu too. The canvas has the following format: sequence number + letter-scene-take. The canvas is automatically incremented at each new take and it is resetting on a new scene creation. The canvas can be used also in one field of the recording file name.

3.5.5. Menu : «File format »

You can specify the number of bits of the BWF file, 16-bit or 24-bit files in this menu

3.5.6. Menu : «pre-record »

4minX supports up to 10s of pre-record, based on the number of tracks and sampling frequency. Pre record is automatic reset on each configuration change. The total duration of your records will be increased by the value of the selected pre-record.

3.5.7. Menu : «Backup False take »

If you enable this function, false take will be saved in a "trash" sub directory of the project. The files keep the same name indexed by a '_x'. If you make several consecutive false take on the same index, we add an another '_x' on older files

3.5.8. Menu «Backup to USB »

If you connect a memory key or an external hard drive on the USB port, you have the opportunity to make a backup of audio files of the current day. The transfer is done in background. You can stop the transfer and resume at a later date, where you are.
The State of the "backup" is shown by icon in the main window instead of the external USB drive icon .

- Symbol red round: backup running
- Symbol red pause: backup in pause
- Symbol yellow exclamation Point: problem,
- Symbol green round: synchronization made

Note: It is strongly recommended to use the mini USB connector to reduce the transfer time.

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3.6. Menu « Settings »

3.6.1. Menu : « Synchronization »

In the "Mode" menu, you can choose the mode "Master" (operation on the internal clock) or select an external sync mode: AES or a word clock (Time code Option)

In the "Frequency" menu, you can select the sampling rate frequency from 32kHz to 96 kHz

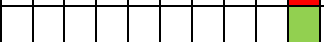
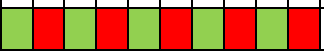
Note: It is imperative to select same sampling rate as the external source of synchronization for the proper functioning of the machine.

3.6.2. Menu : Time Code (Option)

In this menu you can set the Time Code mode of operation:
- Off: all the records begin to 0h0m0s
-Free Run: Time code runs independently on its current value
-Ext TC: 4MinX following continuously an external code, including judgment time
-Ext Tc / cont: 4MinX synchronizes to an external TC and continues to run the TC even if the source is disconnected.
-
You also have the option to configure video format which is associated with: 23.976, 24, 25, 29.97, 30, 29.97 drop or 30 drop frames per second.

Set Time Code menu specify its value for the "free run" mode or when 4MinX is used as a generator of time code. An adaptation of LEMO5points to two sheets BNC cable is available as an option.

Led bicolor on the right side of the 4minX gives you the State of the Time Code module configuration

1 second	1 second	
		Time code not set
		Time code set
		Reader mode
		Low Voltage (TC not set)
		Low Voltage (TC set)
		“Recovery” mode

3.6.1. Menu : « Snapshots »

You can create configurations memories. All configurations related to audio and audio files will be stored in each memory.

3.6.2. Menu : « Tone »

Allows to adjust the level of the tone generator between -6dBFS to -20dBFS

3.6.3. Menu : « Display »

The menu "Brightness" allows both adjust the brightness of the screen and all of DEL present in the face before.

The "Metering thresholds" menu allows setting the threshold for each LED of the bargraph. These same settings are used for the display of the levels on the TFT screen.
The "Bargraph mode" menu offers you the possibility to change the display mode of the audio levels on the screen between VU mode and dBFS mode.
In VU mode, the 0dB level corresponds to the threshold of the yellow led.

The "Bargraph count" menu allows you to benefit of 4 additional bargaphs in mode "full". 4 Additional bargraphs are blue instead of green.

The « Bargraph display » menu allows you to select between 2 mode the bargraphs sources ; The ‘Tracks’ mode follow file/tracks configuration and teh ‘User’ take in care selection made on “Bargraph sources" menu.

The "Bargraph sources" menu offers you the possibility to customize the sources of 8 bargraphs on the screen.
Note: the 4 mic/line inputs bargaphs led show the post fader level (cannot be changed)

3.6.4. Menu : Function keys

This menu allows you to configure function keys for the “recording” mode.
You can assigned 2 functions by touch, through the use of the "shift" key before pressing the function key.

Here is a list of the available functions:

- For mic/line inputs
    - Gain, filters, phase, Limiter, solo

- Meta data
    - Note
    - Scene name
    - Type of take
    - Canvas
- Other functions
    - Slate, Tone,…

3.7. Menu : « Tools »

3.7.1. Menu : Power down

It is imperative to go through this menu to turn off the machine if you don't want to lose settings and configurations.

3.7.2. Menu : Sleep

This menu allows putting the 4Minx in standby. In standby, the consumption is reduced to 1.5W. All microphones power are cut and the 9V for the wireless transceivers et receiver is turn off.
By pressing during 2s the Esc key you return to the normal operating mode in 10s

3.7.3. Menu : Eject media

TO AVOID ANY PROBLEM WITH THE FILE TABLE ON THE SD CARD, IT IS IMPERATIVE TO PASS THROUGH THIS MENU BEFORE REMOUVING THE SDCARD OF ITS HOSTER

3.7.4. Menu : Format media

Through this menu, you can format quickly your SD card with FAT32 file system.

3.7.5. Menu : Reset settings

This action will destroy all configurations registered in the machine.
You can also, via this menu, return to the "factory configuration".

Note: restart requested after this action!
Note: The audio files in the memory card are not destroyed!

3.7.6. Menu : Import/export configurations

With these two menus, you can import and export your projects and your configuration of machine on the SD card.

Note: A reboot of the machine is necessary after importing a configuration.

Note: Via the export menu/debug, you can retrieve all the information relevant to analyze problems on the SD card directory

3.7.7. Warning

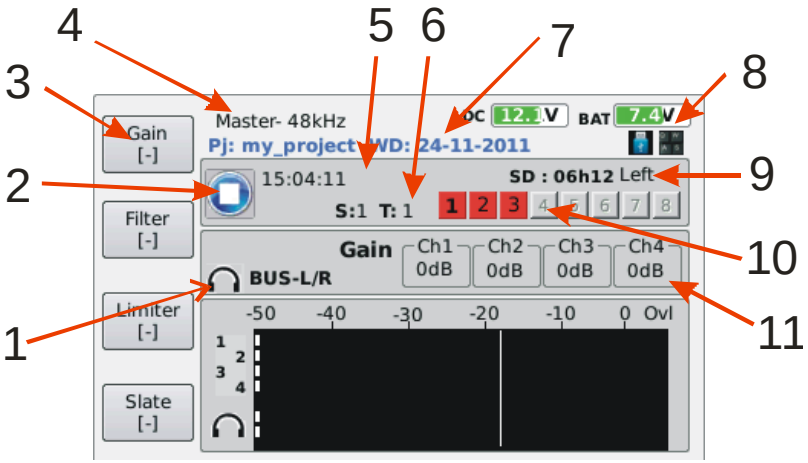
You have 3 sub menu to set warning threshold:

- Warning threshold for the NP-F battery
- Warning threshold for the external DC power
- Warning threshold for remaining SD card disk space.

3.7.8. Update

Check on the SD card an update file and launch the update if it is found

3.8. Recording interface



1 : Show monitoring source and listening mode
2 : Recorder state : Stop, Recording, Pause, play
3 : Function keys : show the name of the function on the first line and in [], the second function accessible with the shift key
4 : Synchronization and sample rate frequency indication.
5 : Time Code or system hour
6 : Last recorded scene and take index.
7 : Project name and work day
8 : USB disk icon and USB keyboard icon
9 : SD/SFHC card information
10 : Files/tracks status
11 : 4 mic/line configuration status for the selection function key (ie : microphone). Chx change to blue when 48V is selected and change to red for T12.

3.9. Recording

To record, a project must be validate (by default "default" project), and having a configuration files valid (by default “Mix down”). This information must be available on the work screen (above: point 7 and 10).
To start a recording, you should press "REC" key. The first pressure, the recorder is set to "READY", and it waiting for a confirmation by a second "REC" press.
The record can be put in pause, by a "REC" press and resume by another “REC” press
Recording is stopped by a double "STOP" press.

The current time or time code and recording time are refreshed every second. There is also the duration available for a new record (See part 9), ensuring that the remaining disk space is sufficient.

3.10. Player

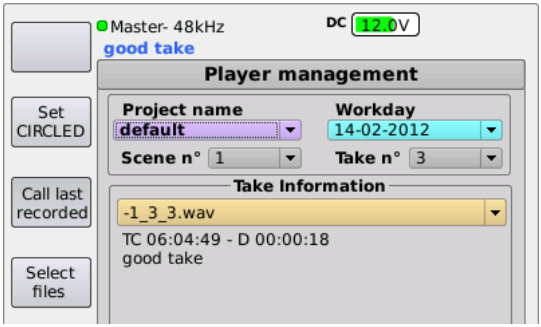
A short “Play” key press show the player module screen.

You can browse between take in the current scene via the F1 and F2 function keys. You can see on the display, the current reading position and the total duration or final Time code of the file. The progress bar allows you to follow the temporal evolution of reading. To coming back in record, you get out of the reading module via the F4 key

To start reading, you should press again the play key. The "pause" is accessible by pressing the same key. The advance and return keys allow to reposition in the file with a step of 5 s or / and 1 minute if the "shift" key is enabled.

Only registered sources will appear in the monitoring. Shortcuts are created automatically with the recorded file types. The bargraphs on the screen display the levels of all recorded channels.

If you want to replay an another day of work and another project file, you can select it via the accessible menu by the F3 key



It was under this module that you can mark the take as "good", via the button "Set Circled".
If files are available on the SD card, they appear in the field "Take Information" and the information provided from metadata information.

3.11. Shortcuts

To optimize the use of 4minx, some shortcuts are available:

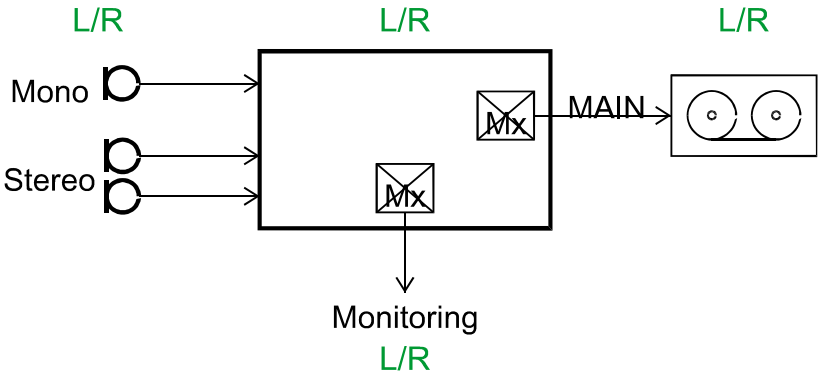
Keys	Function
« Headphone »	Display monitoring shortcut or source list
« Headphone » twice	Display listening mode
« Stop » + « << »	False take
« Stop » + « >>»	New scene
« Shift » + « OK »	To inhibit or activate the recording of a file. The navigation between files is made by the encoder and the switch between the tow state by OK (red : recorded, green : set but not recorded)
« Shift » + « Esc »	Change the display information of the SDCARD state
« Shift » + « Fx »	Access to the second key function feature

3.12. Using the L/R ↔ M/S transcoding

This chapter shows examples of situations where L/R↔M/S matrixing can be used and the effect of matrixing in these situations. Due to the flexibility of 4MINX, this is not an exhaustive view and other configurations are also possible.

3.12.1. Case 1: standard stereo engineering

This is the most common application. In this case, mono microphones or normal (L/R) stereo microphone couples are used, and the output of the mixer is in standard stereo format.

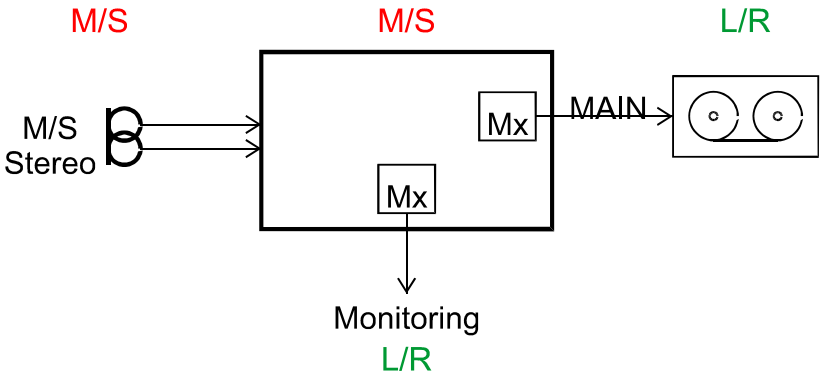


1. L/R↔M/S matrixing is not needed in such an operating mode.
2. However, L/R↔M/S matrixing may be used occasionally for monitoring, as a way of visually checking the stereo image coherence on the level meter display. If matrixing the monitored signal, the “left” bargraph shows the L+R sum, while the “right” bargraph shows the L-R difference. For common stereo production, the L-R level should be much lower than the L+R level, especially when mono compatibility is desired. On the contrary, L-R level higher than L+R level would warn about a possible problem in sound pick-up (e.g. one microphone in a stereo couple is phase reversed).

3.12.2. Case 2: stereo recording using M/S microphones

In this case, M/S stereo microphone couples are used (typically the association of a directional cardioid transducer for the “M” channel and a bidirectional “figure of 8” transducer for the “S” channel), but the output of the mixer is in standard stereo format. The M should be connected on the input 1 or 3 and the S on the input 2 or 4.

The M/S coupling mode should be enabling in the menu. The output signal is a stereo signal in this case.



Matrixing is also needed for monitoring a normal stereo signal on the headphones (monitoring set in “M/S” position), except for monitoring the output “OUT” because it is already decoded to L/R format.

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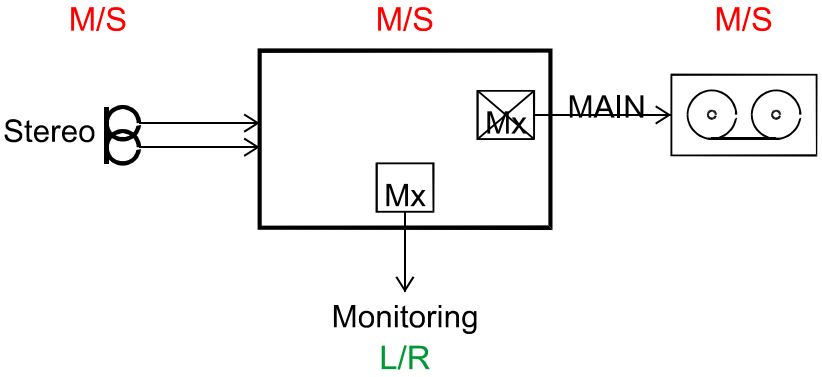
3.12.3. Case 3: M/S recording using M/S microphones

In this case, M/S stereo microphone couples are used, and the output is kept in M/S format for recording. In this way, further stereo image processing is made possible with studio equipment in later production.



The mixer buses process M (Mid) and S (Side) signals. L/R↔M/S matrixing is not applied at the MAIN output (Outputs kept configured in “L/R” mode). Monitoring is here set in “M/S” mode, as matrixing is needed for monitoring a normal stereo signal on the headphones and meters.

4. Technical Specifications

4.1. Microphone/Line inputs

Number	4
Format	Electronic symmetrical input
Socket	XLR3 Femelle, 3 points
Microphone powering modes	"Phantom", 48 V "Tonader" T12 V
Maximum input level (with "Pad" on input 1 and 2)	+39 dBu
Maximum input level (input 3 &4)	+19 dBu
Input headroom	40 dB
Input stage gain (menu setting)	0 to 50 dB, 10 dB steps
Equivalent input noise (EIN) (Gin = 50 dB)	< -128 dBu (200 Ω, 22 Hz - 22 kHz)
Maximum gain, analog in to out	90 dB
Bandwidth	10 Hz - 50 kHz (+0 dB, -1 dB)
Common Mode Rejection	≥ 90 dB @ 1 kHz
Mic Input impedance	> 2 kΩ
Line Input impedance	> 10kΩ

4.2. Line input

Number	1 x 2 channels
Format	2 channels, electronically
Socket	Female 5-pin XLR 1 : Ground 2 : Line 1 + 3 : Line 1 – 4 : Line 2 + 5 : Line 2-
Maximum input level	+24 dBu
Bandwith	10 Hz - 50 kHz (+0 dB, -1 dB)
Commun mode rejection	≥ 90 dB @ 1 kHz
Input Impedance	> 10kΩ

4.3. AES inputs

Number	3
Format	AES-3
Socket	XLR male 3-pin Switchcraft
Digital microphone powering mode	"Phantom", 10 V 250mA by socket AES-42 normalization

4.4. "Line Out" balanced analog outputs

Number	2
Format	2 channels, electronically
Socket	Male 5-pin XLR 1 : ground 2 : Line 1/3 + 3 : Line 1/3 – 4 : Line 2/4 + 5 : Line 2/4-
Output attenuators (Pad)	-40 dB, balanced, separate for L and R
Maximum output level (= 0 dBFS)	Adjustable via menu, -9 dBu to +22 dBu
Source impedance	≤ 100 Ω
Output balance	≥ 40 dB, 20Hz - 20 kHz
Accuracy	> 60 dB, 20Hz - 20 kHz
Channel isolation	> 90 dB (22Hz - 22 kHz)
Signal/Noise Ratio	> 80 dB (soit THD+N < 0,01 %)
SINAD (Signal to Noise and Distortion Ratio)	≥ 40 dB, 20Hz - 20 kHz

4.5. "Line Out" unbalanced analog outputs

Audio signals are the same as line output 1 and 2.

Format	2 channels, unbalanced
Socket	Mini-jack 3.5mm, stereo
Output level	6dB below balanced output
Maximum output level	+16 dBu
Source impedance	≤ 100 Ω

4.6. Digial outputs

3 mini XLR TA3 provide 2 digital channels 3 times.

The pin allocation of the “TA3” socket is as follows:

Pin	Function
1	**Ground**
2	**+ Output**
3	**- Output**

The outputs levels have an AES level, 4Vc-c110 Ω.

The SPDIF adaptor cable (See Annex: Accessory), make audio level adaptation to have these characteristic:

Protocol	CEI 958 , SPDIF, "consumer"
Format	Unbalanced, Transformer isolated
Connector	RCA mal
Level (on 75 Ω)	0,5V c-c
Source Impedance	75 Ω

4.7. Headphone output

Socket	Jack 6.35mm, stereo
Maximum output level	+20 dBu
Acceptable output load	≥ 16 Ω

4.8. "Direct I/O" interface

Pinout of the subD 9 pins:

Pin	Function
1	Pre microphone amplifier channel 1
2	Pre microphone amplifier channel 3
3	Ground
4	Contact
5	power (+2,5v)
6	Pre microphone amplifier channel 2
7	Pre microphone amplifier channel 4
8	Ground
9	Command input (0V..+2.5V)

4.9. "EXT I/O": Interface for RF transmitters/receivers

Socket	12-pin, Neutrik MiniCon
Audio signals for transmitters	Unbalanced, 2 channels, line level
Maximum level	Adjustable via menu, -20 dBu to +10 dBu
Source impedance	1 kΩ

The pin allocation of the “EXT I/O” socket is as follows:

Pin	Function	Direction
1	L signal to RF transmitter	Output
2	Not used	-
3	Analog signal ground	-
4	Analog signal ground	-
5	R signal to RF transmitter	Output
6	+ Input 4bis	Input
7	- Input 4bis	Input
8	+9V output	Output
9	- Input 3bis	Input
10	Analog signal ground	-
11	+ Input 3bis	Input
12	-	Input

4.10. Power supply

Socket	Hirose HR10-7R-4S female 4 pins
Nominal Voltage	12 V
Minimum Voltage	8 V to supply 4MinX and 10V minimum for the battery charger
Maximum Voltage	18 V

The power socket has following pin allocation:

Pin	Function
1	Ground
2	
3	+ External DC for the internal battery charger
4	+ 4Minx external DC input

4.1. Time Code

Pin	Function	Direction
1	Ground	
2	-LTC	Input
3	ASCII	Input/output
4	Tuning	Output
5	LTC	Output

4.2. Dimensions and weight

Dimensions (including connectors)	260 x 75 x 195 mm (10.2”x3.0”x7.7”)
Weight	1900 g

4.3. Environmental

4MINX can operate from–20 °C to +55 °C ambient temperature (-4 °F to 131 °F).

4MINX complies with EC directives regarding safety, EMC and hazardous substances (RoHS):

- Safety : compliant with EN60950
- Susceptibility: compliant with EN50082-1
- Emission: compliant with EN55022 (class B)

4.4. Options

4.4.1. : XLR3 or Hirose 10 pins

On request 4MinX can be equipped with XLR3M in place of XLR5M outputs. In this case, only two channels will be available instead of the 4 channels.

Upon request, replacing the female base XLR5M outputs 3/4, 4MinX can be equipped with a base 10 pins Hirose RM15TRD-10S, for wire connection for "Go /Return", unbalanced, with a two channels analog recorder. The entrance is style accessible on the XLR 5F.

1	Left output +	5	Right input +
2	Left output -	6	Right input -
3	Right output +	7	Left input +
4	Right output -	8	Left input -
9	Ground	10	Ground

5. Annexes

5.1. Overview of connectors and front panel elements

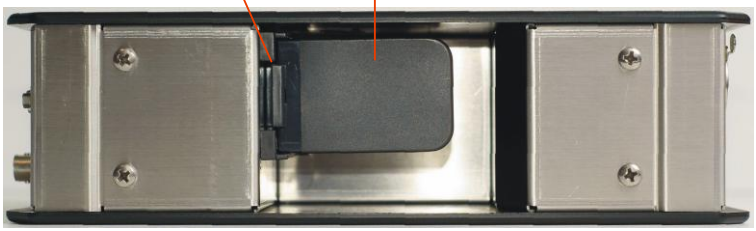
4MinX's front panel :

1	Channel change setting keys		
2	Channel gain	**9**	Monitoring menu access
3	Panpot or other feature	**10**	Display
4	Channel adjustment & status	**11**	" On/Off – Escape key and OK key
5	Master gain & bus level L/R	**12**	Rotary interface
6	External DC/Charge" LED	**13**	Headphone volume control
7	Function keys	**14**	Slate microphone
8	Recording keypad	**15**	Shift key

4Minx's back panel :

1	Battery socket
2	NP-F Battery

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
F1
F2
F3
F4
OK
Lim
Ovl
P1
P2
P3
P4
Master
DC
L
R


16
17

Left Panel:

1 Mic/Ligne inputs (XLR3F)

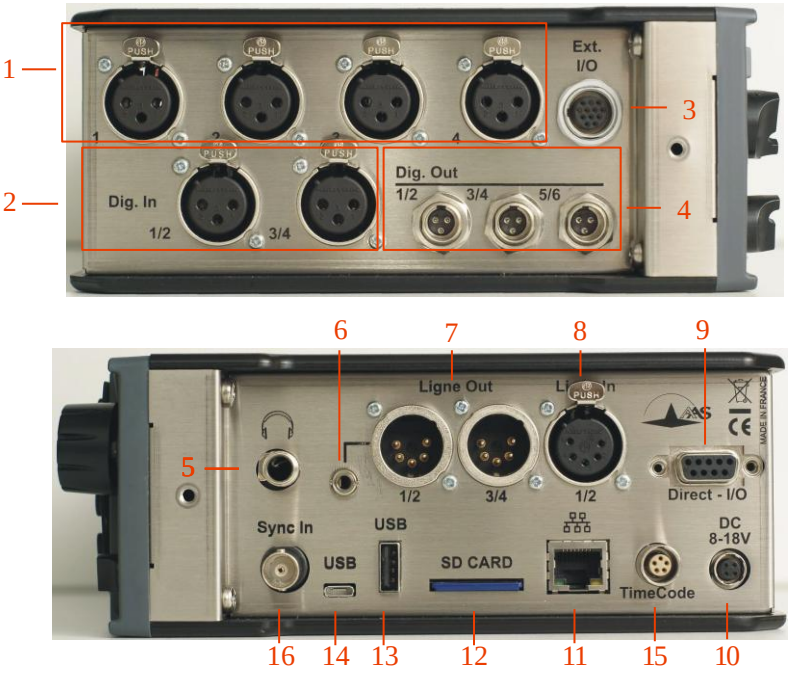
2 Digital inputs AES-3 / 42 (XLR3F)

3 Minicon 12pins interface for wireless transmitter/receiver

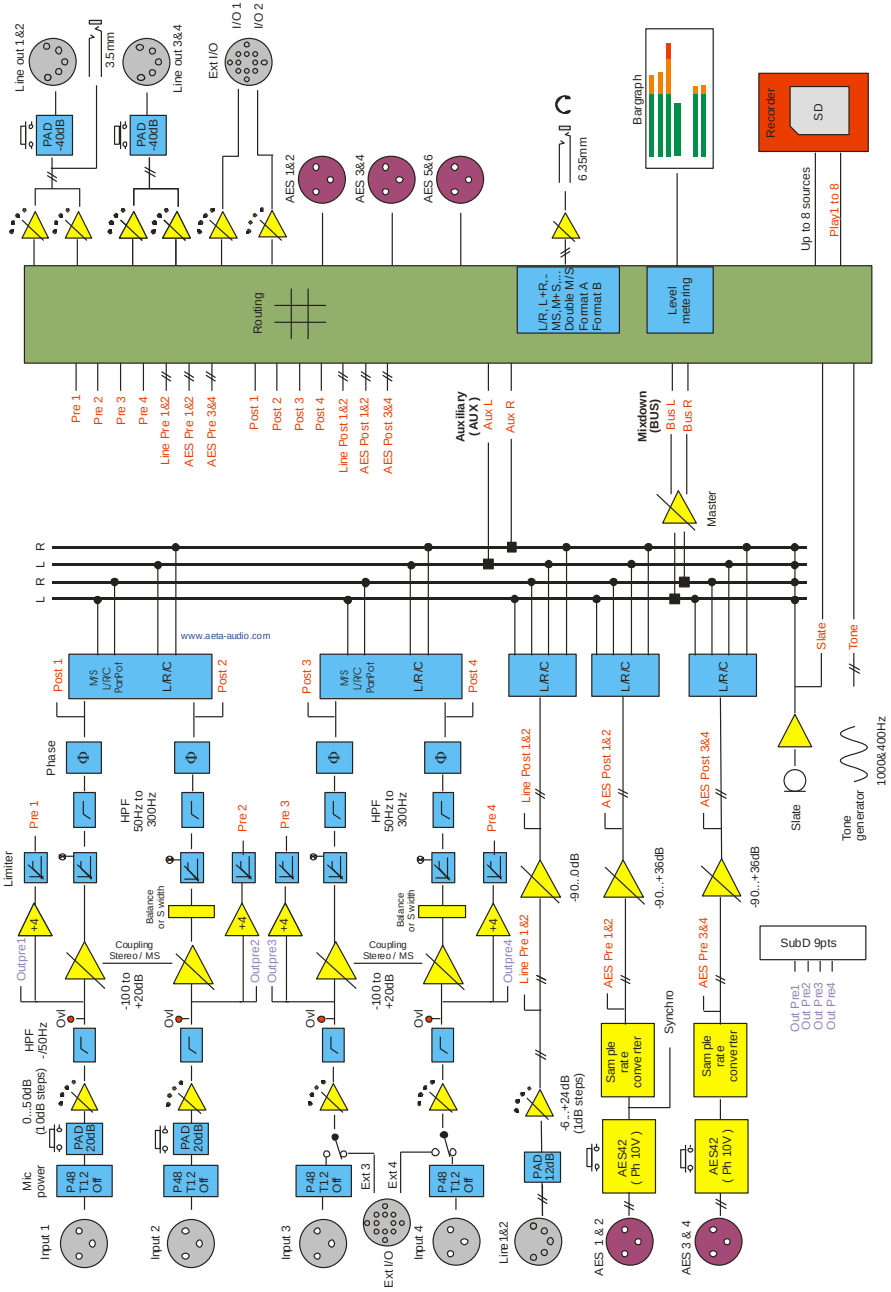
4 Digital outputs AES-3 (TA3)

Right panel:

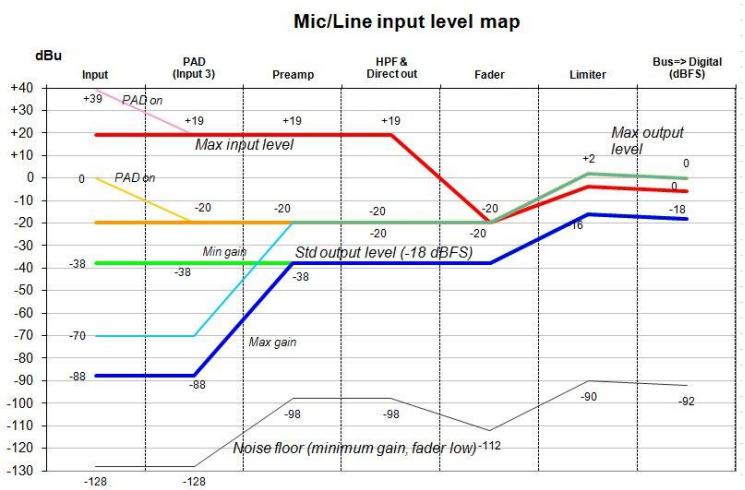
5 Stereo headphone output
6 Auxiliary stereo output, unbalanced
7 Main “Line” outputs, balanced
8 Line In / Return inputs
9 Direct outputs from the 4 channel
10 External power input
11 Ethernet interface
12 SD/SDHC-CARD holster
13 USB host
14 Micro USB 2.0 OTG
15 Time Code input/output (Optionel)
16 Word clock input (Optionel)

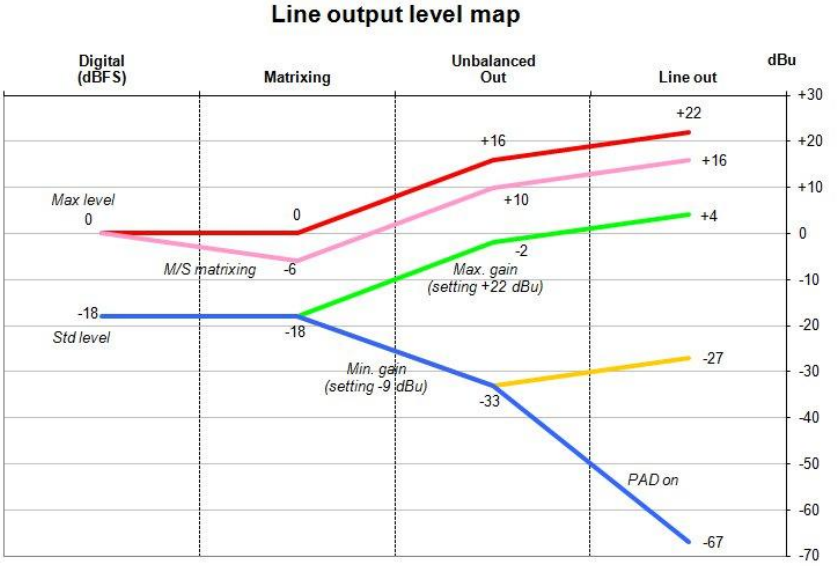


5.2. Block diagram

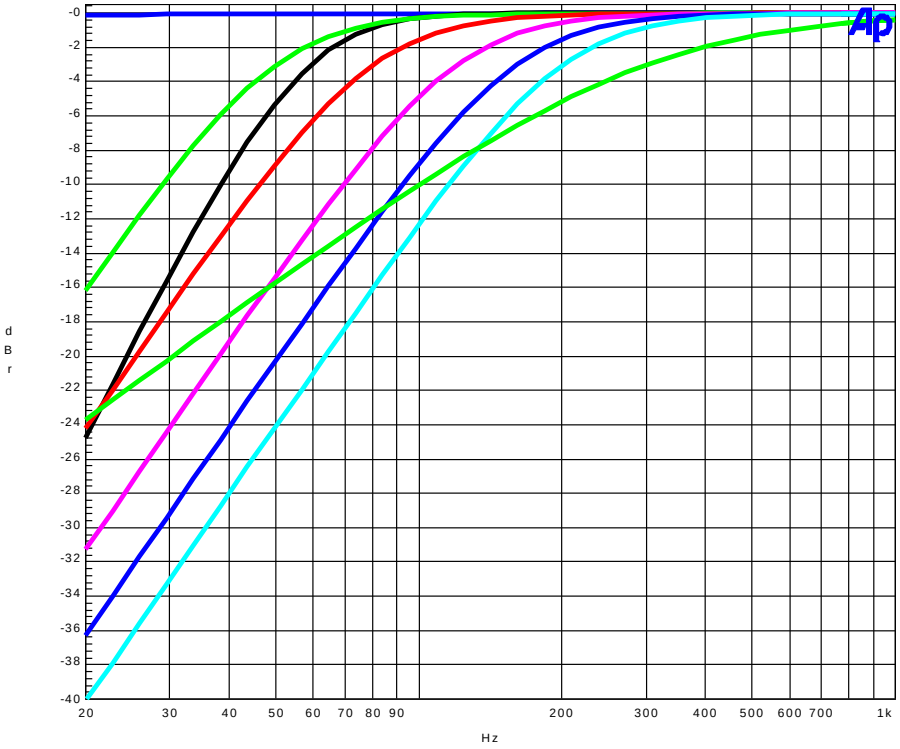

Line out 1&2
3.5mm
Line out 3&4
Ext I/O
I/O 1
I/O 2
PAD -40dB
AES 1&2
AES 3&4
AES 5&6
6.35mm
Bargraph
Recorder
SD
Up to 8 sources
Play1 to 8
Routing
L/R, L+R... M/S, M+S... Double M/S Format A Format B
Level metering
Pre 1
Pre 2
Pre 3
Pre 4
Line Pre 1&2
AES Pre 1&2
AES Pre 3&4
Post 1
Post 2
Post 3
Post 4
Line Post 1&2
AES Post 1&2
AES Post 3&4
Auxiliary (AUX)
Aux L
Aux R
Mixdown (BUS)
Bus L
Bus R
Master
L R L R
www.aeta-audio.com
MS L/R/C Hard-f
Phase
HPF 50Hz to 300Hz
Limiter
+4
Balance or Width
Coupling Stereo / MS
-100 to +20dB
Ovl
HPF -/50Hz
0...50dB (1.0dB steps)
PAD 20dB
Mic power
P48 T1.2 Off
Input 1
Input 2
Input 3
Input 4
Ext 3
Ext 4
Ext I/O
Line 1&2
AES 1 & 2
AES 3 & 4
-90...0dB
-90...+36dB
PAD 12dB
-6...+24dB (1dB steps)
AES42 (Ph 10V)
Sam ple rate converter
Synchro
Slate
Tone
Tone generator
1000&400Hz
SubD 9pts
Out Pre1
Out Pre2
Out Pre3
Out Pre4

5.3. Level maps



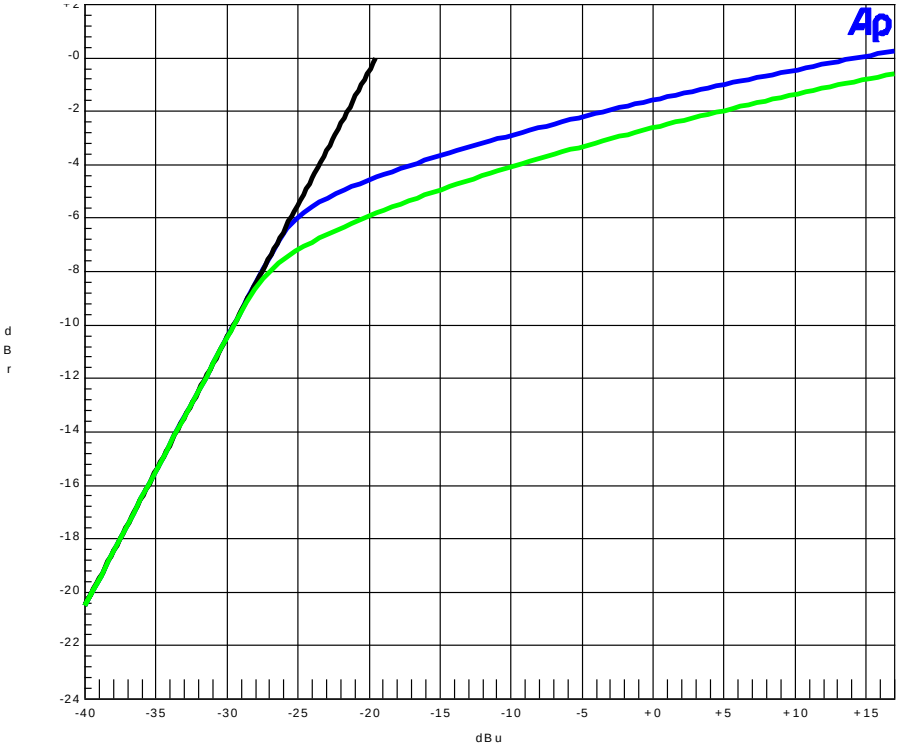


5.4. Filters



Blue	No filter
Black	50Hz 18dB/Oct Analog
Green	50Hz 12dB/Oct Digital
Red	80Hz 12dB/Oct Digital
Pink	120Hz 12dB/Oct Digital
Dark blue	160Hz 12dB/Oct Digital
Cyan	200Hz 12dB/Oct Digital
Green	300Hz 6dB/Oct Digital

5.5. Limitor



Black	No limitor
Blue	Threshold set to -6dBFs
Green	Threshold set to -8dBFs

5.6. Accessories

Many accessories are available, including:

Power supply AC/DCconvertor

NPF-960 Battery

NP1 holdster for NP1 battery

Car adaptor power cable

Adaptor cable XLR5 to 2 XLR3 for line outputs

Adaptor cable from 2 XLR3 to XLR5 for line inputs

AES adaptor cable from TA3 to XLR3

Specific adaptor cable for wireless microphone receiver and transmitter

Compact keyboard : QZERTY

Micro USB cable adptor to HOST interface

Carring Bag

Other (on request):
Adaptor cable for AES output to SPDIF on RCA
Adaptor Time code cable between Lemo 5 and 2 BNC connectors
MiniCon 12pins alone

NOTE

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